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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,987	12/15/2003	Daniel R. Juliano	10001.002100 (NVLS 2848)	4161

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EXAMINER	
MCDONALD, RODNEY GLENN	
ART UNIT	**PAPER NUMBER**
1753	

DATE MAILED: 07/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/735,987	JULIANO ET AL.	
	Examiner	Art Unit	
	Rodney G. McDonald	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,8,22-25 and 33-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-5,8 and 33-38* is/are allowed.

6)☒ Claim(s) *22-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 22 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Lai (U.S. Pat. 6,683,425).

Regarding claim 22, Lai '425 teach a method of magnetron sputtering comprising forming a first separatrix (i.e. 513 or 515) to confine a first plasma; confining the first separatrix (i.e. 513 or 515) within a second separatrix (i.e. 514), the first separatrix (i.e. 513 or 515) and the second separatrix (i.e. 514) each comprising a surface having a null region (i.e. 511 and 512) through which ions escape. Depositing a thin film on a substrate with ions escaping through the null region of the second separatrix (i.e. 514). (See Fig. 5B; Column 6 lines 33-53; Column 4 lines 35-43)

Regarding claim 24, Lai '425 teach that the target can be hollow target in the form of an HCM (i.e. hollow cathode magnetron). (Column 4 lines 12-19)

2. Claims 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Lai (U.S. Pat. 6,683,425).

Regarding claim 22, Lai '425 teach a method of magnetron sputtering comprising forming a first separatrix (i.e. 513) to confine a first plasma; confining the first separatrix (i.e. 513) within a second separatrix (i.e. 515), the first separatrix (i.e. 513) and the second separatrix (i.e. 515) each comprising a surface having a null region (i.e. 511) through which ions escape. Depositing a thin film on a substrate with ions escaping through the null region of the second separatrix (i.e. 515). (See Fig. 5B; Column 6 lines 33-53; Column 4 lines 35-43)

Regarding claim 23, Lai '425 teach confining the second separatrix (i.e. 515) within a third separatrix (i.e. 514), the third separatrix (i.e. 514) comprising a null region (i.e. 512) through which ions may escape and wherein the ions escaping through the null region (i.e. 511) of the second separatrix (i.e. 515) pass through the null region (i.e. 512) of the third separatrix (i.e. 514) to deposit onto the substrate. (See Fig. 5B; Column 6 lines 33-53; Column 4 lines 35-43)

Regarding claim 24, Lai '425 teach that the target can be hollow target in the form of an HCM (i.e. hollow cathode magnetron). (Column 4 lines 12-19)

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 22 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Ejima et al. (Japan 09-195043).

Regarding claim 22, Ejima et al. teach a method of magnetron sputtering comprising forming a first separatrix (5) to confine a first plasma; confining the first separatrix (5) within a second separatrix (5), the first separatrix and the second separatrix each comprising a surface having a null region 4 through which ions may

escape through and depositing a thin film on a substrate with ions escaping through the null region of the second separatrix (5). (See Abstract; Figures 1 and 2)

Regarding claim 25, Ejima et al. teach utilizing a planar target 1. (See Abstract; Figures 1 and 2)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai (U.S. Pat. 6,683,425) in view of Ejima et al. (Japan 09-195043).

Lai is discussed above and all is as applies above. (See Lai discussed above)

The difference between Lai and the present claims is the use of a planar target (Claim 25).

Regarding claim 25, Ejima et al. teach utilizing a planar target in a magnetic field utilizing separatrices. (See Ejima et al. discussed above)

The motivation for utilizing a planar target is that it allows for consuming the target entirely. (See Ejima Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Lai '425 by utilizing a planar target as taught by Ejima because it allows for consuming the target entirely.

5. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ejima et al. (Japan 09-195043) in view of Lai (U.S. Pat.6,179,973).

Ejima et al. is discussed above and all is as applies above. (See Ejima et al. discussed above)

The difference between Ejima et al. and the present claims is that utilizing a hollow target is not discussed.

Lai '973 teach utilizing a hollow target in a magnetic field of separatrices. (See Lai '973 discussed above)

The motivation for utilizing a hollow target is that it allows for enhancing film step coverage. (Column 2 lines 43-46)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ejima et al. by utilizing a hollow cathode as taught by Lai '973 because it allows for enhancing film step coverage.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claim 22, 23, and 25 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 15-20 of U.S. Patent No. 6,683,425 in view of Ejima et al. (Japan 09-195043).

Claims 15-20 of U.S. Pat. 6,683,425 teach a method of magnetrons puttering including created first and second with null points. The third magnetic field would create the third separatrix with null point. (See Claims 15-20)

The difference between U.S. Pat. No. 6,683,425 and the present claims is that the confining of the separatrixes is not discussed.

Ejima teach confining the separatrixes by utilizing a separatrix. (See Ejima discussed above)

The motivation for confining the separatrixes is that it allows for complete erosion of the targets. (See Ejima discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified U.S. Pat. 6,683,425 by confining the separatrixes as taught by Ejima et al. because it allows for complete erosion of the targets.

7. Claim 24 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 15-20 of U.S. Patent No. 6,683,425 in view of Lai et al. (U.S. Pat. 6,179,973).

The difference not yet discussed is that the use of a hollow target is not discussed.

Lai et al. '973 teach utilizing a hollow target. (See Lai et al. '973 discussed above)

The motivation for utilizing the hollow target is that it allows for enhancing film step coverage. (Column 2 lines 43-46)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a hollow cathode as taught by Lai '973 because it allows for enhancing film step coverage.

Allowable Subject Matter

8. Claims 1-5, 8 and 33-38 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter:

Claims 1-5 and 8 are allowable over the prior art of record because the prior art of record does not teach a method of magnetron sputtering including forming a first closed plasma loop and forming an open plasma loop by forming a separatrix such that a portion of the open plasma loop enclosed by the separatrix is cut-off by a target of a magnetron apparatus, the separatrix comprising a surface having a null region through which ions may pass through.

Claims 33-38 are allowable over the prior art of record because the prior art of record does not teach a method of magnetron sputtering including forming a first closed plasma loop; forming an open plasma loop wherein the open plasma loop is formed by physically blocking a return path of a separatrix comprising a surface having a null field region through which ions may pass through.

Response to Arguments

Applicant's arguments filed April 7, 2006 have been fully considered.

In response to the argument that the prior art does not teach forming separatrices, it is argued that newly cited references to Ejima et al. and Lai '425 teach forming separatrices as required by claims 22-25. However these references do not teach the open loop plasma and closed loop plasma in combination with the separatrices. This action will be made NON-Final based on the newly cited references.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
June 22, 2006